

Remarks

Claims 1-35 are currently pending the application.

The Examiner is respectfully requested to reconsider and withdraw the rejection of claims 1-8 under 35 U.S.C. 103(a) as being unpatentable over Drake et al. (U.S. 6,083,379) in view of Clausen (Structure and Stability of Nitrided Alumina-Supported MO Catalysts) and Wu et al. (U.S. 6,162,352).

Drake discloses a hydrodesulfurization catalyst. This catalyst comprises alumina and a metal selected from the group consisting of molybdenum and tungsten. The catalyst can also contain an additional metal, selected from the group consisting of iron, cobalt, and nickel. Preferably, the catalyst is presulfided (*see* Drake, col. 5, lines 13-25).

Clausen discloses alumina supported, unpromoted molybdenum catalysts that are nitrided and sulfided. *See* Clausen, second paragraph.

Wu discloses a sulfided composition comprising, consisting of, or consisting essentially of, a zinc spinel, a zeolite, alumina, cobalt and molybdenum. *See* Wu, column 1, lines 64-67. Wu discloses an elemental molybdenum weight percent in the range of from about 1 weight percent to about 50 weight percent based on the total weight of the catalyst composition. *See* Wu, column 4, lines 18-23.

Applicants argue that Drake, Clausen, and Wu do not disclose the instant invention, either alone or in combination. The Clausen reference is not properly combinable with the Drake reference. Clausen notes “little is known about the transformation of the nitride structures and the structure and morphology of the resulting sulfide structures” (*see* Clausen, first paragraph). Therefore, it would not

have even been obvious for Drake to nitride the HDS catalyst, along with the pre-sulfiding. There is no need for pre-nitriding even suggested in the Drake reference. Applicants assert that one of ordinary skill in the art would not find motivation in Drake to seek out the nitriding of Clausen. In addition, there is no suggestion in Drake to seek out the weight percents of Wu.

The Examiner is respectfully requested to reconsider and withdraw the rejection of claims 9-17 under 35 U.S.C. 103(a) as being unpatentable over Wu (US 6,162,352) in view of Clausen (Structure and Stability of Nitrided Alumina-Supported Mo Catalysts).

Wu discloses preparing a catalyst composition by mixing a zeolite, zinc spinel, and alumina together to form a mixture. The mixture is then shaped, preferably into extrudates. The mixture is thereafter calcined, and then it is incorporated with cobalt and molybdenum, and then it is calcined again. Then, the catalyst is sulfided (See Wu, col. 2, line 52 – col. 3, line 45). Clausen discloses nitriding, and then sulfiding alumina-supported unpromoted molybdenum catalysts (See Clausen, 2nd paragraph).

The Examiner states “It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Wu to utilize the ammonia based nitriding of Clausen because both the Clausen and Wu references utilize catalysts that are effective for the purpose of hydrotreating and removing impurities. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein nitriding is accomplished at least in part by contacting the cobalt/molybdenum modified catalyst

with a decomposable nitrogen-containing compound at a temperature of from 650 C to 800 C because nitriding is disclosed by the Clausen reference and it would be appropriate to utilize any temperature needed for accomplishment of nitriding so that an effective catalyst composition is formed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein nitriding is performed prior to contacting the cobalt/molybdenum catalyst with a sulfur-containing hydrocarbon stream under hydrodesulfurization conditions because Wu discloses a process whereby sulfiding is performed prior to contacting the catalyst with a sulfur-containing hydrocarbon stream under hydrodesulfurization conditions and the Clausen reference discloses nitriding prior to sulfiding.” (See Office Action, page 7, paragraph 3, to page 8, paragraph 1). Applicants respectfully disagree.

Applicants submit that neither Wu nor Clausen, either alone or in combination, disclose the claimed invention. Clausen discloses nitriding an alumina-supported, unpromoted molybdenum catalyst. The Wu compound has a zeolite, a zinc spinel, and cobalt in addition to alumina and molybdenum. This is clearly a different composition. It is not obvious that nitriding would also be effective for a different catalyst just because that different catalyst can also be used for hydrotreating and removing impurities. If two catalysts are used for the same purpose, but are in fact different compositions, then it is not obvious that the same pretreatment would be effective on both catalysts. Applicants submit that claim 9 of the instant application distinguishes over Wu by including the additional limitation of nitriding a cobalt/molybdenum alumina catalyst prior to sulfiding. The Clausen reference does

not supply the nitriding limit because it is not properly combinable with Wu. There is no motivation to combine Clausen with Wu, apart from improper hindsight.

Response to Response to Arguments

The Examiner states “the applicant, however, fails to also point out that in the fourth paragraph of the Clausen reference a catalyst that is both pre-nitrided and pre-sulfided shows an increase in absorbed species as compared to a similar catalyst that has been sulfided in the standard manner. Also, it is important to note that both pre-sulfiding and pre-nitriding are very well known in the art for various hydrotreating catalysts.” *See* Final Office Action, page 7, lines 4-8.


The Clausen reference pertains to unpromoted catalysts (*see* Clausen, second paragraph). The instant application and the Drake reference both apply to promoted catalysts. The Clausen reference does state “little is known about the transformation of the nitride structures and the structure and morphology of the resulting sulfide structures.” *See* Clausen, first paragraph. Therefore, it would not be obvious the pre-nitriding as well as pre-sulfiding would work for promoted catalysts.

The Examiner further states that “both the catalysts of Drake and Clausen are effective hydrotreatment catalysts and therefore it would be appropriate to combine the references to include the pre-sulfiding and pre-nitriding of Clausen” (*see* Final Office Action, page 7, lines 9-11). Applicants maintain that what works for one hydrotreating catalyst does not automatically work for another. Since little is known about the nitride structure transformation and the resulting sulfide structure morphology according to Clausen, it is not obvious that both pre-nitriding and pre-sulfiding would work for different hydrotreating catalysts.

In view of the amendments and arguments above, claims 1-35 are believed to be in condition for allowance. Therefore early allowance of claims 1-35 is respectfully requested.

Respectfully submitted,

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